

(R) Automotive and Off-Highway Air Brake Reservoir Performance and Identification Requirements

1. **Scope**—This SAE Standard applies to all new production air brake reservoirs used in automotive vehicles and off-road machines. This document defines an “air brake reservoir” as a reservoir having single or multiple compartments that is used for storage of compressed air. This document does not apply to accumulators or reservoirs for storage of gases other than compressed air.

The reservoirs tested per these requirements shall be selected from production stock and shall be equipped with all permanently attached items such as mounting brackets and fitting bosses.

- 1.1 **Purpose**—The purpose of this document is to provide MINIMUM performance requirements and a method of identifying new production air brake reservoirs. Additional requirements for corrosion resistance and pressure fatigue tests should be considered by the vehicle manufacturer. Additional or different considerations should be given to non-metallic and non-circular reservoirs.

2. **References**

- 2.1 **Applicable Publications**—The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest version of SAE publications shall apply.

- 2.1.1 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 117-95—Operating Salt Spray (Fog) Apparatus

ASTM D 1654-92—Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

3. **Certification requirements**

- 3.1 **Proof Tests**—All air brake pressure reservoirs shall be capable of withstanding a hydrostatically applied internal pressure of not less than five times the reservoir rated working pressure.

There shall be no indication of rupture or permanent circumferential deformation exceeding 1% after having been subjected to this test pressure for 5 min.

When testing multiple compartment reservoirs, the pressure shall be applied to and exhausted from all compartments simultaneously. Then pressurize each compartment individually to 1.5 times the indicated rated working pressure to verify the baffle strength in both directions.

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3.2 FMVSS Conformance (Off-Highway Applications need not comply)—Initially and at a continuing frequency of not less than once annually, one or more air brake reservoirs of each size, type (single compartment, multiple compartment, dual compartment with integral check valve) and mounting configuration must be tested for compliance to all requirements of applicable Federal Motor Vehicle Safety Standards.

4. Performance Requirements

4.1 Leakage Tests—Each air brake reservoir shall be capable of the following applicable tests. When air pressure is used to perform this test, protection against explosive rupture shall be provided. The effectiveness of the protective enclosure shall be verified prior to use. A sealing compound may be used to seal port threads.

4.1.1 SINGLE COMPARTMENT RESERVOIRS—All air reservoirs shall be subjected to twice the indicated rated working pressure. Leakage shall not exceed 20 std cm³/m.

4.1.2 MULTIPLE COMPARTMENT RESERVOIRS WITHOUT CHECK VALVES

4.1.2.1 Reservoir Shell—Perform the same test as in 4.1.1 by applying the pressure to and exhausting from all compartments simultaneously.

4.1.2.2 Reservoir Baffle Plate(s)—Check for leakage and weld integrity of the internal baffle plate(s) by applying a pressure equal to the indicated rated working pressure to one side of the baffle plate(s). Leakage shall not exceed 20 std cm³/m.

4.1.3 DUAL COMPARTMENT RESERVOIRS WITH INTEGRAL CHECK VALVES

4.1.3.1 Reservoir Shell—Perform the same test as in 4.1.1 except the pressure must be applied through the supply (inlet) compartment and exhausted through the service (exhaust) compartment.

4.1.3.2 Reservoir Baffle Plates—Perform the same tests as in 4.1.2.2 by plugging the check valve closed when required.

4.1.3.3 Check Valve—With a pressure equal to the indicated rated working pressure in both compartments, exhaust pressure from the supply compartment. The service compartment pressure must remain at the rated working pressure. Leakage past the check valve shall not exceed 100 std cm³/m.

4.2 Corrosion Test—All air brake reservoirs shall be protected internally and externally against detrimental corrosion through the use of either a corrosion-resistant base material or a suitable protective coating or treatment. Any additional tests and requirements deemed important shall be agreed upon by purchaser and seller.

4.2.1 EXTERIOR SURFACE—The exterior surface shall withstand a minimum of 48 h exposure to salt spray in accordance with ASTM B 117-95. Upon completion of the exposure, evaluate the specimen per ASTM D 1654-92. All maximum creepage points from the scribe are to be measured. A minimum of six measurements are required on each side of the scribe (12 total). No one measurement greater than 3 mm is permissible. No corrosion spots or blisters are permissible in the unscribed area (Rating Number 10). Small openings between mounting brackets and shells shall be disregarded in the corrosion evaluation. Also, edges or areas damaged in specimen preparation or purposely unpainted areas such as threads shall be disregarded.

- 4.2.2 INTERIOR SURFACE—The interior surface shall withstand a minimum of 96 h exposure to salt spray in accordance with ASTM B 117-95. Upon completion of the exposure, evaluate the specimen per ASTM D 1654-92. All maximum creepage points from the scribe are to be measured. A minimum of six measurements are required on each side of the scribe (12 total). No one measurement greater than 3 mm is permissible. No corrosion spots or blisters are permissible in the unscribed area (Rating Number 10). Hidden lap areas such as end cap protrusion, internal baffle crevices, and fitting boss clearances shall be disregarded in the corrosion evaluation. Also, edges or areas damaged in specimen preparation or purposely unpainted areas such as threads shall be disregarded.
- 4.2.3 SPECIMEN PREPARATION—A production reservoir shall be quartered by cutting it in such a manner that each section includes 50% of the end cap and 25% of the shell. The sectioned test reservoir should have a minimum of 72 h air exposure. Then the specimen shall be scribed in accordance with 5.1 of ASTM D 1654-92. The specimen is then to be placed in the salt spray booth in a manner to provide thorough drainage and in accordance with Section 7 of ASTM B 117-95.
5. **Identification**—All air brake reservoirs which meet the requirements of this document shall be permanently identified to show the manufacturer, SAE J10 plus latest revision, the rated working pressure and the date of manufacture (day, month, and year). For example:
- a. XYZ - SAE J10 XXX99 - 1034 kPa (150 psi) Rated Working Pressure - 150897
6. **Notes**
- 6.1 **Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE TRUCK AND BUS SUPPLY AND CONTROL COMPONENTS SUBCOMMITTEE
OF THE SAE TRUCK AND BUS BRAKE COMMITTEE

SAE J10 Revised FEB2000

Rationale—SAE J10 is currently written for steel reservoirs. Aluminum tanks are being used today and non-metallic materials, such as fiber-reinforced plastics, are being considered. Sections 1.1 and 4.2 have been revised to indicate that SAE J10 is not limited to only steel reservoirs.

The current SAE J10 does not clearly define the pressure test requirements for multiple compartment reservoirs. A proof test was added under 3.1 to verify baffle strength at 1.5 times the rated working pressure. A 1.5 factor is a common requirement of many pressure vessel codes such as ASME. The production test in 4.1.2.2 remains at the rated working pressure.

Most truck manufacturers require tests in addition to SAE J10, primarily regarding corrosion protection. Section 1.1 has been revised to stress that SAE J10 provides MINIMUM requirements which may need to be revised and/or expanded to meet each specific application.

A finish paint is usually applied over the reservoir. An adhesion test was added to the exterior surface requirements in 4.2.1 to insure the adhesion of the finish paint. Also, the welded areas should be considered as part of the corrosion evaluation. The benefits of any type of protective coating are greatly diminished if areas are left unprotected.

A few minor revisions and updates were made. The ASTM specifications were updated to their current revisions in 2.1.1 and 4.2. A note in 4.1.2 was clarified and moved 3.1. The rated working pressure in Section 5 was revised to include the metric conversion, 1034 kPa (150 psi). A hard conversion to metric units is not considered appropriate at this time for this product.

Relationship of SAE Standard to ISO Standard—Not applicable.

Application—This SAE Standard applies to all new production air brake reservoirs used in automotive vehicles and off-road machines. This document defines an “air brake reservoir” as a reservoir having single or multiple compartments that is used for storage of compressed air. This document does not apply to accumulators or reservoirs for storage of gases other than compressed air.

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Reference Section

ASTM B 117-95—Operating Salt Spray (Fog) Apparatus

ASTM D 1654-92—Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

Developed by the SAE Truck and Bus Supply and Control Components Subcommittee

Sponsored by the SAE Truck and Bus Brake Committee